

MODEL EQUATIONS FOR A CHAOTIC PLASMA CIRCUIT

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Certain chaotic oscillators are able to have their phases synchronized with the phase of a periodic forcing oscillator. In this phase synchronized state, the phases of the two oscillators are in step with each other while their amplitudes remain uncorrelated. This phenomenon has been demonstrated numerically and also has been observed experimentally. In particular, an experimental plasma circuit forced with a sinusoidal function shows that phase synchronization can be achieved for a certain range of parameter (frequency and amplitude) values of the periodic pacer. Here we present a preliminary study of a set of three coupled equations representing the experimental plasma setup. In these equations, the voltage-current relationship of the plasma is represented by a piece-wise linear function. We show our simulation results and compare them with the numerical outputs of the Roessler system.